# INDEX

ACTIVITY, provitamin A, relative, of carotene when introduced orally and parenterally in rat. Studies on carotenoid metabolism. VI. ... 299
Adult human subjects, calcium metabolism and calcium requirements of, variability in ... 407
—— —— —— —— —— of, effect of citrate ion on ... 423
Albino rat, growing. Relation of fat to economy of food utilization. I. ... 203
—— —— mature. Relation of fat to economy of food utilization. II. ... 213
ALLISON, JAMES B., ROBERT D. SEELEY, JACK H. BROWN AND JOHN A. ANDERSON. The evaluation of proteins in hypoproteinemic dogs ... 237
Alpha-tocopherol and essential unsaturated fat acids, interrelation of. Covitamin studies. V. ... 699
Amino acid excretion and nitrogen balance, intravenously administered nitrogen on, relative efficiency of different forms of ... 581
—— acids, essential, biological value of proteins in relation to, which they contain. III. Comparison of proteins with mixtures of the amino acids ... 715
—— —— —— —— —— —— —— —— —— —— —— —— —— —— I. Endogenous nitrogen of man ... 533
—— —— —— —— —— —— —— —— —— —— —— —— —— —— II. Interconvertibility of biological values illustrated by supplementing eggs and soy protein with essential amino acids ... 555
—— —— mixtures of, comparison of proteins with. Biological value of proteins in relation to the essential amino acids which they contain. III. ... 715
ANDERSON, JOHN A. See Allison, Seeley, Brown and Anderson ... 237
ANGULO, JUAN J., CESAR FUENTES AND MARGARITA A. JOHNSON. The carotene content of Cuban foods ... 463
Animal and plant origin, wheat germ, corn germ, and some other protein foods of, proteins of, comparative growth-promoting value of ... 675
—— protein, supplements, nutritional significance of, in diet of chick ... 485
Apparent prolongation of the life span of rats by intermittent fasting ... 363
Appreciation, an. John R. Murlin, investigator, teacher, colleague ... 5
Ascorbic acid content of whole blood and plasma of normal rats with evidence of a sex difference ... 573
—— —— thiamine, riboflavin, nicotinic acid and pantothenic acid content of restaurant foods ... 755
—— —— vitamin A and spinal fluid pressure relationships in young bovine ... 229
Atabrine, young rats receiving, growth of, dietary calcium upon, effect of variations in the level of ... 647
Autoclaving soybean oil meal, influence of, on availability of cystine and methionine for chick ... 449
Availability of cystine and methionine, influence of autoclaving soybean oil meal on, for chick ... 449
—— —— wheat bran phosphorus for the rat ... 193
AYRES, MARY M. See Bosshardt, Ydse, Ayres and Barnes ... 23

BALANCE, nitrogen, and amino acid excretion, intravenously administered nitrogen on, relative efficiency of different forms of ... 581
BARNES, RICHARD H. See Bosshardt and Barnes ... 13
—— —— —— —— Ydse, Ayres and Barnes ... 23
BAROTT, HERBERT G., AND EMMA M. PRINGLE. Energy and gaseous metabolism of the chicken from hatch to maturity as affected by temperature ... 35
BENNETT, MARGARET J. See Sarett, Bennett, Riggs and Cheldelin ... 755
BENTLEY, LILLIAN S., AND AGNES F. MORGAN. The influence of choline and of trypan blue upon the utilization of carotene and vitamin A for liver storage of vitamin A ... 333
Bioassay test for vitamin A, use of mackerel protein in. Studies on nutritive value of fish proteins. II. ... 187
Biological value of proteins in relation to the essential amino acids which they contain. III. Comparison of proteins with mixtures of the amino acids ... 715
—— —— —— —— —— —— —— —— —— —— —— —— —— —— II. Interconvertibility of biological value illustrated by supplementing egg and soy protein with essential amino acids ... 555
—— —— —— —— —— —— —— —— —— —— —— —— —— —— I. The endogenous nitrogen of man ... 533
Biotin, pyridoxine and "folic acid." Nutritive value of canned foods. XVII. ... 347
Blood, level of vitamin A in, and the effects of added vitamin A on the conjunctiva ... 471
—— whole, and plasma of normal rats, ascorbic acid content of, with evidence of sex difference ... 573
BOSSHARDT, DAVIS K., AND RICHARD H. BARNES. The determination of metabolic fecal nitrogen and protein digestibility ... 13

—— —— —— Laura C. Ydse, Mary M. Ayres and Richard H. Barnes. The use of mice for the measurement of the growth promoting quality of proteins ..... 23
Boutwell, Roswell K., Robert P. Geyer, Andrew W. Halverson and Edwin B. Hart. The availability of wheat bran phosphorus for the rat ..... 193
Bovine, young, vitamin A, ascorbic acid and spinal fluid pressure relationships in ..... 229
Bran phosphorus, wheat, availability of, for rat ..... 193
Breiter, Herta. See McLean, Lewis, Jensen, Hathaway, Breiter and Holmes ..... 127
Briggs, George M. Nicotinic acid deficiency in turkey poults and the occurrence of perosis ..... 79
Bronze poults, failure of feather pigmentation in, due to lysine deficiency ..... 387
Brown, Edna. See Murlin, Edwards, Hawley and Clark ..... 533
—— Jack H. See Allison, Seeley, Brown and Anderson ..... 237
Butter fat or corn oil, lactose-dried milk ration containing, rats fed, growth and food preference of .. 321

Calcification in poults, relative efficiency of vitamin $D_3$ and cod liver oil in promoting, influence of sources of phosphorus on ..... 599
Calcium, dietary, level of, effect of variations in, upon the growth of young rats receiving atabrine .. 647
——, —— retention of, by growing rats, effect of different grades of cocoa upon ..... 377
—— metabolism and calcium requirements, variability in, of adult human subjects ..... 407
—— —— of adult human subjects, effect of citrate ion on ..... 423
—— phosphorus and vitamin $D_3$, influence of, upon fat content of skeleton in growing pigs ..... 565
—— requirement, further studies on, of preschool children ..... 127
—— requirements and calcium metabolism, variability in, of adult human subjects ..... 407
Calories, restricted, growth rate with, and on injection of the growth hormone. Studies on the comparative nutritive value of fats. VII. ..... 737
Canned foods, nutritive value of. XVII. Pyridoxine, biotin and "folic acid" ..... 347
Cannon method and rat growth method, evaluation by. Studies on nutritive value of fish proteins. I. ..... 175
Carbohydrate, protein and fat in diet, effect of amount of, on incidence and extent of carious lesions. Dental caries in the cotton rat. VI. ..... 439
Caries, dental, in cotton rat. VI. The effect of the amount of protein, fat and carbohydrate in the diet on the incidence and extent of carious lesions ..... 439
Carious lesions, incidence and extent of, protein, fat and carbohydrate in diet on, effect of amount of. Dental caries in the cotton rat. VI. 439
Carlson, Anton J., and Frederick Hoelzel. Apparent prolongation of the life span of rats by intermittent fasting ..... 363
Carotene and vitamin A, utilization of, influence of choline and of trypan blue upon, for liver storage of vitamin A ..... 333
Carotene content of Cuban foods ..... 463
Carotenoid metabolism, studies on. VI. Relative provitamin A activity of carotene when introduced orally and parenterally in rat ..... 299
Cheldelin, Vernon H. See Sarett, Bennett, Riggs and Cheldelin ..... 755
Chick, availability of cystine and methionine for, influence of autoclaving soybean oil meal on ..... 449
—— diet of, protein supplements in, nutritional significance of ..... 485
—— plasma fibrinogen in, influence of diet on ..... 509
Chicken, energy and gaseous metabolism of, from hatch to maturity as affected by temperature ..... 35
Children, preschool, calcium requirement of, further studies on ..... 127
—— —— nitrogen metabolism of ..... 665
—— —— phosphorus metabolism of ..... 657
Choline and trypan blue, influence of, upon utilization of carotene and vitamin A for liver storage of vitamin A ..... 333
—— deficiency, development of hepatic cirrhosis due to, significance of fatty infiltration in ..... 141
—— —— hemorrhagic kidneys due to, occurrence of, factors affecting ..... 621
Cirrhosis, hepatic, due to choline deficiency, development of, significance of fatty infiltration in ..... 141
Citrate ion, effect of, on calcium metabolism of adult human subjects ..... 423
Clagett, Dorothy D. See Lew, Clagett, Meyer and Hathaway ..... 665
Clark, Leland C. See Murlin, Edwards, Hawley and Clark ..... 533

—— —— —— ..... 555
—— Marie F. See McKey, Clark, Meyer and Hathaway ..... 657
Cobalt, dietary iron and copper, some interrelationships of, in mtabolism ..... 609
Cocoa, different grades of, effect of, upon retention of dietary calcium by growing rats ..... 377
Cod liver oil and vitamin $D_3$, relative efficiency of, influence of sources of phosphorus on, in promoting calcification in poults ..... 599
Colostrum and milk, thiamine, riboflavin, nicotinic acid and pantothenic acid content of, of cow and ewe ..... 51
Comparative growth-promoting value of the proteins of wheat germ, corn germ, and of some other protein foods of plant and animal origin ..... 675
—— value of certain dietary proteins for hemopoiesis in the rat ..... 765
Comparison of four methods for studying the urinary excretion of thiamine ..... 635
—— —— proteins with mixtures of the amino acids. Biological value of proteins in relation to the essential amino acids which they contain. III. ..... 715
Components, purified, selection of. Self selection of diet. I. ..... 397
Composition and volume of rat milk, effect of changes in diet on ..... 249
Conjunctiva, effects of added vitamin A on, and the level of vitamin A in the blood ..... 471

Copper, dietary iron and cobalt, some interrelationships of, in metabolism 609
Corn germ, wheat germ, and some other protein foods, proteins of, comparative growth-promoting value of, of plant and animal origin 675
—— oil or butter fat, lactose-dried milk ration containing, rate fed, growth and food preference of 321
Cotton rat, dental caries in. VI. The effect of the amount of protein, fat and carbohydrate in the diet on the incidence and extent of carious lesions 439
Covitamin studies. V. The interrelation of alpha-tocopherol and essential unsaturated fat acids 699
Cow and ewe, colostrum and milk of, thiamine, riboflavin, nicotinic acid and pantothenic acid content of 51
Cox, Warren M., Jr., and Arthur J. Mueller. The relative efficiency of different forms of intravenously administered nitrogen on nitrogen balance and amino acid excretion 581
—— —— —— See Mueller and Cox 249
Crockett, Mary E. See Deuel, Hendrick and Crockett 737
—— —— —— Movitt, Crockett, Smyth and Winzler 747
Crops, vegetable, in relation to soil fertility. IV. Nutritional values of New Zealand spinach 59
Cuban foods, carotene content of 463
Cunha, Tony J. See Heinemann, Ensminger, Cunha and McCulloch 107
Cystine and methionine, availability of, influence of autoclaving soybean oil meal on, for chick 449

Dam, Henrick. See Field and Dam 509
Darnell, A. L. See Pearson and Darnell 51
Day, Harry G., Khalil G. Wakim, William H. Zimmerman and Leland S. McClung. Nutritional Nutritional status of rats on milk diets containing succinylsulfathiazole 355
Deficiencies, pyridoxine and pantothenic acid, study of, in monkey (Macaca mulatta) 685
Deficiency, choline, development of hepatic cirrhosis due to, significance of fatty infiltration in 141
—— —— hemorrhagic kidneys due to, occurrence of, factors affecting 621
—— lysine, failure of feather pigmentation in bronze poults due to 387
—— nicotinic acid, in turkey poults and occurrence of perosis 79
—— pantothenic acid, and reproduction in rat 497
Dental caries in the cotton rat. VI. The effect of the amount of protein, fat and carbohydrate in the diet on the incidence and extent of carious lesions 439
Determination of metabolic fecal nitrogen and protein digestibility 13
Deuel, Harry J., Jr., Cornelia Hendrick and Mary E. Crockett. Studies on the comparative nutritive value of fats. VII. Growth rate with restricted calories and on injection of the growth hormone 737
—— —— —— —— —— —— Eli Movitt, Mary E. Crockett, Irene M. Smyth and Richard J. Winzler. Studies on the comparative nutritive value of fats. VIII. The failure of ether extraction to lower the nutritive value of skimmed milk powder in diets containing various vegetable fats 747
—— —— —— —— Mary C. Hrubetz, Cornelia H. Johnston, Hilda S. Rollman and Ernest Geiger. Studies on the nutritive value of fish proteins. II. The use of mackerel protein in the bioassay test for vitamin A 187
—— —— —— —— —— —— Richard J. Winzler, Ernest Geiger and George Schnakenberg. Studies on the nutritive value of fish proteins. I. Evaluation by the rat growth method and by the Cannon method 175
—— —— —— See Sexton, Mehl and Deuel 299
Diet(s), changes in, effect of, on volume and composition of rat milk 249
—— containing various vegetable fats, skimmed milk powder in, nutritive value of, failure of ether extraction to lower. Studies on the comparative nutritive value of fats. VIII. 747
—— influence of, on plasma fibrinogen in chick 509
—— milk, rats on, nutritional status of, containing succinylsulfathiazole 355
—— of chick, animal protein supplements in, nutritional significance of 485
—— protein, fat and carbohydrate in, effect of amount of, on incidence and extent of carious lesions. Dental caries in the cotton rat. VI. 439
—— self selection of. I. Selection of purified components 397
Dietary calcium, level of, effect of variations in, upon the growth of young rats receiving atabrine 647
—— —— retention of, effect of different grades of cocoa upon, by growing rats 377
—— iron, copper and cobalt, some interrelationships of, in metabolism 609
—— niacin and tryptophane requirement, factors affecting, of growing rat 85
—— proteins, certain, comparative value of, for hemopoiesis in rat 765
Digestibility, protein, and metabolic fecal nitrogen, determination of 13
Dogs, hypoproteinemic, proteins in, evaluation of 237
Dubin, Isadore N. See Handler and Dubin 141

Edwards Leslie E. See Murlin, Edwards, Fried and Szymanski 715
—— —— —— —— —— —— Hawley and Clark 533
—— —— —— —— —— —— —— —— 555
Effect of changes in diet on the volume and composition of rat milk 249
—— —— different grades of cocoa upon the retention of dietary calcium by growing rat 377

—— —— the amount of protein, fat and carbohydrate in the diet on the incidence and extent of carious lesions. Dental caries in the cotton rat. VI. 439
—— —— —— citrate ion on the calcium metabolism of adult human subjects 423
—— —— variations in the level of dietary calcium upon the growth of young rats receiving atabrine 647
Effects of added vitamin A on the conjunctiva and the level of vitamin A in the blood 471
Efficiency of swimmers, observations on, as related to some changes in pre-exercise nutriment 525
—— relative, of different forms of intravenously administered nitrogen balance and amino acid excretion 581
—— —— —— vitamin $D_3$ and cod liver oil, influence of sources of phosphorus on, in promoting calcification in poults 599
Egg and soy protein, biological values illustrated by supplementing, interconvertibility of, with essential amino acids. Biological value of proteins in relation to essential amino acids which they contain. II. 555
ELLIOTT, RALPH F. See Forbes, Swift, Elliott and James 203
—— —— —— —— —— —— 213
ELVEHJEM, CONRAD A. See Ives, Pollard, Elvehjem and Strong 347
—— —— —— —— Krehl, Sarma, Teply and Elvehjem 85
—— —— —— —— McCall, Waisman, and Jones 685
—— —— —— —— Schweigert, Shaw, Zepplin and Elvehjem 439
Endogenous nitrogen of man. Biological value of proteins in relation to the essential amino acids which they contain. I. 533
Energy and gaseous metabolism of the chicken from hatch to maturity as affected by temperature 35
ENSMINGER, MARION E. See Heinemann, Ensminger, Cunha and McCulloch 107
Ether extraction, failure of, to lower the nutritive value of skimmed milk powder in diets containing various vegetable fats. Studies on the comparative nutritive value of fats. VIII. 747
Evaluation by the rat growth method and by the Cannon method. Studies on the nutritive value of fish proteins. I. 175
—— of proteins in hypoproteinemic dogs 237
EVANS, HERBERT M. See Nelson and Evans 497
EVANS, ROBERT J., AND JAMES MCGINNIS. The influence of autoclaving soybean oil meal on the availability of cystine and methionine for the chick 449
Evaporated milk, market milk, and powdered whole milk, vitamin C content of 161
Ewe and cow, colostrum and milk of, thiamine, riboflavin, nicotinic acid and pantothenic acid content of 51
Excretion, amino acid, and nitrogen balance, intravenously administered nitrogen on, relative efficiency of different forms of 581
—— urinary, of thiamine, four methods for studying, comparison of 635
Extraction, ether, failure of, to lower the nutritive value of skimmed milk powder in diets containing various vegetable fats. Studies on the comparative nutritive value of fats. VIII. 747
Eye condition, length of life, growth and tooth structure, relation of vitamin A intake to 67

FACTORS affecting the dietary niacin and tryptophane requirement of the growing rat 85
—— —— —— occurrence of hemorrhagic kidneys due to choline deficiency 621
Failure of ether extraction to lower the nutritive value of skimmed milk powder in diets containing various vegetable fats. Studies on the comparative nutritive value of fats. VIII. 747
—— —— feather pigmentation in bronze poults due to lysine deficiency 387
Fasting, intermittent, life span of rats by, apparent prolongation of 363
Fat(s) acid, essential unsaturated, and alpha-tocopherol, interrelation of. Covitamin studies. V. 699
—— butter, or corn oil, lactose-dried milk ration containing, rats fed, growth and food preference of 321
—— comparative nutritive value of, studies on. VIII. Failure of ether extraction to lower the nutritive value of skimmed milk powder in diets containing various vegetable fats 747
—— —— —— —— —— —— VII. Growth rate with restricted calories and on injection of the growth hormone 737
—— content of skeleton in growing pigs, influence of phosphorus, calcium and vitamin $D_3$ upon 565
—— protein and carbohydrate in diet, effect of amount of, on incidence and extent of carious lesions. Dental caries in the cotton rat. VI. 439
—— relation of, to economy of food utilization. I. By the growing albino rat 203
—— —— —— —— —— —— —— II. By the mature albino rat 213
—— various vegetable, diets containing, skimmed milk powder in, nutritive value of, failure of ether extraction to lower. Studies on the comparative nutritive value of fats. VIII. 747
Fatty infiltration, significance of, in development of hepatic cirrhosis due to choline deficiency 141
Feather pigmentation, failure of, in bronze poults due to lysine deficiency 387
Fecal nitrogen, metabolic, and protein digestibility, determination of 13
Fertility, soil, vegetable crops in relation to. IV. Nutritional values of New Zealand spinach 59

Fibrinogen, plasma, in chick, influence of diet on ... 509
FIELD, JOHN B., AND HENRIK DAM. Influence of diet on plasma fibrinogen in the chick ... 509
Fish proteins, nutritive value of, studies on. I. Evaluation by rat growth method and by Cannon method ... 175
——— ——— ——— ——— ——— II. The use of mackerel protein in the bioassay test for vitamin A ... 187
Fluid pressure, spinal, vitamin A and ascorbic acid relationships in young bovine ... 229
"Folic acid," pyridoxine and biotin. Nutritive value of canned foods. XVII. ... 347
Food(s), canned, nutritive value of. XVII. Pyridoxine, biotin and "folic acid" ... 347
—— Cuban, carotene content of ... 463
—— preference and growth of rats fed a lactose-dried milk ration containing butter fat or corn oil 321
—— restaurant, thiamine, riboflavin, nicotinic acid, pantothenic acid content of ... 755
—— some other protein, wheat germ, and corn germ of plant and animal origin, proteins of, comparative growth-promoting value of ... 675
—— utilization, economy of, relation of fat to. I. By the growing albino rat ... 203
——— ——— ——— ——— ——— II. By the mature albino rat 213
FORBES, ERNEST B., RAYMOND W. SWIFT, RALPH F. ELLIOTT AND WILLIAM H. JAMES. Relation of fat to economy of food utilization. I. By the growing albino rat ... 203
——— ——— ——— ——— ——— ——— II. By the mature albino rat ... 213
FRIED, SERAPHINE. See Murlin, Edwards, Fried and Szymanski ... 715
——— ——— ——— Hawley and Clark ... 533
FRITZ, JAMES C., JOHN H. HOOPER, JOHN L. HALPIN AND HOWARD P. MOORE. Failure of feather pigmentation in bronze poults due to lysine deficiency ... 387
FUENTES, CESAR. See Angulo, Fuentes and Johnson ... 463
Further studies on the calcium requirement of preschool children ... 127

GASEOUS and energy metabolism of chicken from hatch to maturity as affected by temperature ... 35
GEIGER, ERNEST. See Deuel, Hrubetz, Johnston, Rollman and Geiger ... 187
——— ——— ——— Winzler, Geiger and Schnakenberg ... 175
Germ, corn, wheat germ and some other protein foods of plant and animal origin, proteins of, comparative growth-promoting value of ... 675
GEYER, ROBERT P. See Boutwell, Geyer, Halverson and Hart ... 193
GIFFT, HELEN H., AND HAZEL M. HAUCK. A comparison of four methods for studying the urinary excretion of thiamine ... 635
GILL, DOROTHY. See Murlin, Edwards, Fried and Szymanski ... 715
——— ——— ——— Hawley and Clark ... 533
GOFF, H. R. See Wittwer and Goff ... 59
Growing albino rat. Relation of fat to economy of food utilization. I. ... 203
—— pigs, skeleton in, fat content of, influence of phosphorus, calcium and vitamin $D_3$ upon ... 565
—— rats, retention of dietary calcium by, effect of different grades of cocoa upon ... 377
Growth and food preference of rats fed a lactose-dried milk ration containing butter fat or corn oil ... 321
—— hormone, injection of, growth rate with restricted calories and on. Studies on the comparative nutritive value of fats. VII. ... 737
—— length of life, tooth structure and eye condition, relation of vitamin A intake to ... 67
—— of young rats receiving atabrine, dietary calcium upon, effect of variations in the level of ... 647
—— promoting quality, use of mice for measurement of, of proteins ... 23
—— —— value, comparative, of the proteins of wheat germ, corn germ, and of some other protein foods of plant and animal origin ... 675
—— rat method and Cannon method, evaluation by. Studies on nutritive value of fish proteins. I. ... 175
—— rate with restricted calories and on injection of the growth hormone. Studies on the comparative nutritive value of fats. VII. ... 737

HALDI, JOHN, AND WINFREY WYNN. Observations on efficiency of swimmers as related to some changes in pre-exercise nutriment 525
HALPIN, J. L. See Fritz, Hooper, Halpin and Moore ... 387
HALVERSON, ANDREW W. See Boutwell, Geyer, Halverson and Hart 193
HAMILTON, TOM S. See Mitchell and Hamilton ... 377
HANDLER, PHILIP. Factors affecting the occurrence of hemorrhagic kidneys due to cholin deficiency ... 621
—— —— AND ISADORE N. DUBIN. The significance of fatty infiltration in the development of hepatic cirrhosis due to choline deficiency 141
HARRELL, RUTH F. Mental response to added thiamine ... 283
HARRIS, PHILIP L. See Hove and Harris ... 699
HART, EDWIN B. See Boutwell, Geyer, Halverson and Hart ... 193
HATHAWAY, MILICENT L. See Lew, Clagett, Meyer and Hathaway ... 665
——— ——— ——— McKey, Clark, Meyer and Hathaway ... 657
——— ——— ——— McLean, Lewis, Jensen, Hathaway, Breiter and Holmes ... 127
HAUCK, HAZEL M. See Gifft and Hauck 635
HAWLEY, ESTELLE E. See Murlin, Edwards, Hawley and Clark ... 533
——— ——— ——— ——— ... 555
HEGSTED, D. M. See Williamson, Hegsted, McKibbin and Stare ... 647

HEINEMANN, WILTON W., MARION E. ENSMINGER, TONY J. CUNHA AND ERNEST C. MCCULLOCH. The relation of the amount of thiamine in the ration of the hog to the thiamine and riboflavin content of the tissue ..... 107
Hemopoiesis in rat, certain dietary proteins for, comparative value of .. 765
Hemorrhagic kidneys, occurrence of, factors affecting, due to choline deficiency ..... 621
HENDRICK, CORNELIA. See Deuel, Hendrick and Crockett ..... 737
—— —— —— —— —— —— Movitt, Crockett, Smyth and Winzler .. 747
Hepatic cirrhosis due to choline deficiency, development of, significance of fatty infiltration in ..... 141
HOELZEL, FREDERICK. See Carlson and Hoelzel ..... 363
Hog, ration of, relation of amount of thiamine in, to thiamine and riboflavin content of tissue ..... 107
HOLMES, JULIA D. See McLean, Lewis, Jensen, Hathaway, Breiter and Holmes ..... 127
HOOPER, J. H. See Fritz, Hooper, Halpin and Moore ..... 387
Hormone, growth, injection of, growth rate with restricted calories and on. Studies on the comparative nutritive value of fats. VII. .. 737
HOUK, A. E. H., A. W. THOMAS AND H. C. SHEEMAN. Some inter-relationships of dietary iron, copper and cobalt in metabolism ..... 609
HOVE, E. L., AND PHILIP L. HARRIS. Covitamin studies. V. The interrelation of alpha-tocopherol and essential unsaturated fat acids .... 699
HRUBETZ, MARY C. See Deuel, Hrubetz, Johnston, Rollman and Geiger ... 187
—— —— —— —— —— —— Winzler, Geiger and Schnakenberg 175
HUGHES, J. S. See Parrish, Shimer and Hughes ..... 321
Human subjects, adult, calcium metabolism and calcium requirements of, variability in ..... 407
—— —— —— —— —— of, effect of citrate ion on ..... 423
Hypoproteinemic dogs, proteins in, evaluation of ..... 237

INFILTRATION, fatty, significance of, in development of hepatic cirrhosis due to choline deficiency .. 141
Influence of autoclaving soybean oil meal on the availability of cystine and methionine for the chick .. 449
—— —— choline and of trypan blue upon the utilization of carotene and vitamin A for liver storage of vitamin A ..... 333
—— —— diet on plasma fibrinogen in the chick ..... 509
—— —— phosphorus, calcium and vitamin $D_3$ upon the fat content of the skeleton in growing pigs . 565
—— —— sources of phosphorus on the relative efficiency of vitamin $D_3$ and cod liver oil in promoting calcification in poults ..... 599
Injection of the growth hormone and restricted calories, growth rate with. Studies on the comparative nutritive value of fats. VII. ... 737
Intake, vitamin A, relation of, to length of life, growth, tooth structure and eye condition ..... 67
Interconvertibility of biological values illustrated by supplementing egg and soy protein with essential amino acids. Biological value of proteins in relation to the essential amino acids which they contain. II. ..... 555
Interrelation of alpha-tocopherol and essential unsaturated fat acids. Covitamin studies. V. ..... 699
Intravenously administered nitrogen, different forms of, relative efficiency of, on nitrogen balance and amino acid excretion ..... 581
Ion, citrate, effect of, on calcium metabolism of adult human subjects ... 423
Iron, dietary, copper and cobalt, some interrelationships of, in metabolism ..... 609
IVES, MARGARET, ANN E. POLLARD, CONRAD A. ELVEHJEM AND FRANK M. STRONG. The nutritive value of canned foods. XVII. Pyridoxine, biotin and "folic acid" ..... 347

JAMES, WILLIAM H. See Forbes, Swift, Elliott and James ..... 203
—— —— —— —— —— —— —— —— 213
JENSEN, ELIZABETH. See McLean, Lewis, Jensen, Hathaway, Breiter and Holmes ..... 127
JOHNSON, MARGARITA. See Angulo, Fuentes and Johnson ..... 463
JOHNSTON, CORNELIA H. See Deuel, Hrubetz, Johnston, Rollman and Geiger ..... 187
—— —— —— —— —— —— Winzler, Geiger and Schnakenberg 175
JONES, D. BREESE, AND KATHERINE D. WIDNESS. The comparative growth-promoting value of the proteins of wheat germ, corn germ, and of some other protein foods of plant and animal origin ..... 675
—— EDITH S. See McCall, Waisman, Elvehjem and Jones ..... 685

KIDNEYS, hemorrhagic, occurrence of, factors affecting, due to choline deficiency ..... 621
KREHL, WILLARD A., P. S. SARMA, LESTER J. TEPLEY AND CONRAD A. ELVEHJEM. Factors affecting the dietary niacin and tryptophane requirement of the growing rat .. 85

LACTOSE-dried milk ration containing butter fat or corn oil, rats fed, growth and food preference of ..... 321
Lesions, carious, incidence and extent of, amount of protein, fat and carbohydrate in diet on, effect of. Dental caries in the cotton rat. VI. 439
LEW, MARION S., DOROTHY D. CLAGETT, FRIEDA L. MEYER AND MILICENT L. HATHAWAY. Nitrogen metabolism of preschool children 665
LEWIS, GLADYS K. See McLean, Lewis, Jensen, Hathaway, Breiter and Holmes ..... 127
Liver oil, cod, and vitamin $D_3$, relative efficiency of, influence of sources of phosphorus on, in promoting calcification in poults ..... 599

—— storage of vitamin A, utilization of carotene and vitamin A for, influence of choline and of trypan blue upon ... 333
Lysine deficiency, failure of feather pigmentation in bronze poults due to ... 387

McCALL, KEITH B., H. A. WAISMAN, CONRAD A. ELVEHJEM AND EDITH S. JONES. A study of pyridoxine and pantothenic acid deficiencies in the monkey (Macaca mulatta) ... 685
McCLUNG, LELAND S. See Day, Wakim, Zimmerman and McClung ... 355
McCULLOCH, ERNEST C. See Heinemann, Ensminger, Cunha and McCulloch ... 107
McGINNIS, JAMES. See Evans and McGinnis ... 449
McHARGUE, J. S. See Rapp, Skinner and McHargue ... 261
—— —— —— —— —— —— —— —— ... 273
McKEY, BEULA V., MARIE F. CLARK, FRIEDA L. MEYER AND MILICENT L. HATHAWAY. Phosphorus metabolism of preschool children ... 657
McKIBBIN, J. M. See Williamson, Hegsted, McKibbin and Stare ... 647
McLEAN, DOROTHY S., GLADYS K. LEWIS, ELIZABETH JENSEN, MILICENT L. HATHAWAY, HERTA BREITER AND JULIA O. HOLMES. Further studies on the calcium requirement of preschool children ... 127
McMILLAN, THELMA J. See Todhunter and McMillan ... 573
Mackerel protein, use of, in bioassay test for vitamin A. Studies on nutritive value of fish proteins. II. ... 187
Man, endogenous nitrogen of. Biological value of proteins in relation to essential amino acids which they contain. I. ... 533
Market milk, evaporated milk, and powdered whole milk, vitamin C content of ... 161
MARVEL, J. P. See Patton, Marvel, Petering and Waddell ... 485
MATTERSON, L. D., H. M. SCOTT AND E. P. SINGSEN. The influence of sources of phosphorus on the relative efficiency of vitamin $D_3$ and cod liver oil in promoting calcification in poults ... 599
Mature albino rat. Relation of fat to economy of food utilization. II. ... 213
Meal, soybean oil, autoclaving, influence of, on availability of cystine and methionine for chick ... 449
MEHL, JOHN W. See Sexton, Mehl and Deuel ... 299
Mental response to added thiamine ... 283
Metabolic fecal nitrogen and protein digestibility, determination of ... 13
Metabolism, calcium, and calcium requirements, variability in, of adult human subjects ... 407
—— —— effect of citrate ion on, of adult human subjects ... 423
—— carotenoid, studies on. VI. Relative provitamin A activity of carotene when introduced orally and parenterally in rat ... 299
—— dietary iron, copper and cobalt in, some interrelationships of ... 609
—— energy and gaseous, of chicken from hatch to maturity as affected by temperature ... 35
—— nitrogen, of preschool children ... 665
—— phosphorus, of preschool children ... 657
Methionine and cystine, availability of, influence of autoclaving soybean oil meal on, for chick ... 449
MEYER, FRIEDA L. See Lew, Clagett, Meyer and Hathaway ... 665
—— —— —— —— McKey, Clark, Meyer and Hathaway ... 657
Mice, use of, for measurement of growth promoting quality of proteins ... 23
Milk and colostrum, thiamine, riboflavin, nicotinic acid and pantothenic acid content of, of cow and ewe ... 51
—— diets, rats on, nutritional status of, containing succinylsulfathiazole ... 355
—— market, evaporated, and powdered whole, vitamin C content of ... 161
—— powder, skimmed, nutritive value of, failure of ether extraction to lower, in diets containing various vegetable fats. Studies on the comparative nutritive value of fats. VIII. ... 747
—— rat, volume and composition of, effect of changes in diet on ... 249
—— ration, lactose-dried, containing butter fat or corn oil, rats fed, growth and food preference of ... 321
MITCHELL, HAROLD H., AND TOM S. HAMILTON. The effect of different grades of cocoa upon the retention of dietary calcium by growing rats ... 377
—— —— —— See Steggerda and Mitchell ... 407
—— —— —— —— —— —— —— —— ... 423
Mixtures of amino acids, comparison of proteins with. Biological value of proteins in relation to the essential amino acids which they contain. III. ... 715
Monkey (Macaca mulatta), pyridoxine and pantothenic acid deficiencies in, study of ... 685
MOORE, H. P. See Fritz, Hooper, Halpin and Moore ... 387
—— LANE A. Vitamin A, ascorbic acid and spinal fluid pressure relationships in the young bovine ... 229
MORGAN, A. LLOYD. See Robertson and Morgan ... 471
—— AGNES F. See Bentley and Morgan ... 333
MOVITT, ELI. See Deuel, Hendrick, Movitt, Crockett, Smyth and Winzler ... 747
MUELLER, ARTHUR J., AND WARREN M. COX, JR. The effect of changes in diet on the volume and composition of rat milk ... 249
—— —— —— See Cox and Mueller ... 581
MURLIN, JOHN R., investigator, teacher, colleague. An appreciation ... 5
—— —— —— LESLIE E. EDWARDS, SERAPHINE FRIED AND THADDEUS A. SZYMANSKI, with the assistance of Elizabeth Nasset, Doris Smith and Dorothy Gill. Biological value of proteins in relation to the essential amino acids which they contain. III. Comparison of proteins with mixtures of the amino acids ... 715

—— —— —— —— —— —— Estelle E. Hawley and Leland C. Clark. Biological value of proteins in relation to the essential amino acids which they contain. II. Interconvertibility of biological values illustrated by supplementing egg and soy protein with essential amino acids 555
—— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— —— I. The endogenous nitrogen of man 533

Nasset, E. S. John R. Murlin, investigator, teacher, colleague. An appreciation 5
—— Elizabeth. See Murlin, Edwards, Fried and Szymanski 715
—— —— —— —— —— Hawley and Clark 533
—— —— —— —— —— —— —— 555
Nelson, Marjorie M., and Herbert M. Evans. Pantothenic acid deficiency and reproduction in the rat 497
New Zealand spinach, nutritional values of. Vegetable crops in relation to soil fertility 59
Niacin and tryptophane requirement, dietary, factors affecting, of growing rat 85
Nicotinic acid deficiency in turkey poults and the occurrence of perosis 79
—— —— thiamine, riboflavin and pantothenic acid content of colostrum and milk of cow and ewe 51
—— —— —— —— pantothenic acid and ascorbic acid content of restaurant foods 755
Nitrogen balance and amino acid excretion, intravenously administered ntirogen on, relative efficiency of different forms of 581
—— endogenous, of man. Biological value of proteins in relation to essential amino acids which they contain. I. 533
—— fecal, metabolic, and protein digestibility, determination of 13
—— intravenously administered, different forms of, relative efficiency of, on nitrogen balance and amino acid excretion 581
—— metabolism of preschool children 665
Nordfeldt, Sam. The influence of phosphorus, calcium and vitamin $D_3$ upon the fat content of the skeleton in growing pigs 565
Nutriment, pre-exercise, some changes in, observations on efficiency of swimmers as related to 525
Nutritional significance of animal protein supplements in the diet of the chick 485
—— status of rats on milk diets containing succinylsulfathiazole 355
—— value of New Zealand spinach. Vegetable crops in relation to soil fertility. IV. 59
Nutritive value, comparative, studies on, of fats. VIII. Failure of ether extraction to lower the nutritive value of skimmed milk powder in diets containing various vegetable fats 747
—— —— —— —— —— —— VII. Growth rate with restricted calories and on injection of the growth hormone 737
—— —— failure of ether extraction to lower, of skimmed milk powder in diets containing various vegetable fats. Studies on the comparative nutritive value of fats. VIII. 747
—— —— of canned foods. XVII. Pyridoxine, biotin and "folic acid" 347
—— —— —— the protein in the tobacco-seed oilmeal 261
—— —— —— tobacco-seed oil 273
—— —— studies on, of fish proteins. I. Evaluation by rat growth method and by Cannon method 175
—— —— —— —— —— —— II. The use of mackerel protein in the bioassay test for vitamin A 187

Observations on efficiency of swimmers as related to some changes in pre-exercise nutriment 525
Occurrence of perosis and nicotinic acid deficiency in turkey poults 79
Oil, cod liver, and vitamin $D_3$, relative efficiency of, influence of sources of phosphorus on, in promoting calcification in poults 599
—— corn, or butter fat, lactose-dried milk ration containing, rats fed, growth and food preference of 321
—— meal, soybean, autoclaving, influence of, on availability of cystine and methionine for chick 449
—— tobacco-seed, nutritive value of 273
Oilmeal, tobacco-seed, protein in, nutritive value of 261
Orten, Aline U. See Orten and Orten 765
—— James M., and Aline U. Orten. The comparative value of certain dietary proteins for hemopoiesis in the rat 765

Pantothenic acid and pyridoxine deficiencies, study of, in monkey Macaca mulatta) 685
—— —— deficiency and reproduction in the rat 497
—— —— thiamine, riboflavin and nicotinic acid content of colostrum and milk of cow and ewe 51
—— —— —— —— nicotinic acid and ascorbic acid content of restaurant foods 755
Parrish, Donald B., Edith R. Shimer and Josiah S. Hughes. Growth and food preference of rats fed a lactose-dried milk ration containing butter fat or corn oil 321
Patton, A. R., J. P. Marvel, H. G. Petering and J. Waddell. The nutritional significance of animal protein supplements in the diet of the chick 485
Paul, Henry E., and Mary F. Paul. The relation of vitamin A intake to length of life, growth, tooth structure and eye condition 67
—— Mary F. See Paul and Paul 67
Pearson, Paul B., and A. L. Darnell. The thiamin, riboflavin, nicotinic acid and pantothenic acid content of colostrum and milk of the cow and ewe 51
Perosis, occurrence of, and nicotinic acid deficiency in turkey poults 79

PETERING, H. G. See Patton, Marvel, Petering and Waddell ..... 485
Phosphorus, calcium and vitamin $D_3$, influence of, upon fat content of skeleton in growing pigs ..... 565
—— metabolism of preschool children 657
—— sources of, influence of, on relative efficiency of vitamin $D_3$ and cod liver oil in promoting calcification in poults ..... 599
—— wheat bran, availability of, for rat ..... 193
Pigmentation, feather, in bronze poults, failure of, due to lysine deficiency 387
Pigs, growing, skeleton in, fat content of, influence of phosphorus, calcium and vitamin $D_3$ upon ..... 565, 573
Plant and animal origin, wheat germ, corn germ and some other protein foods of, proteins of, comparative growth-promoting value of ..... 675
Plasma and whole blood of normal rats, ascorbic acid content of, with evidence of sex difference ..... 573
—— fibrinogen in chick, influence of diet on ..... 509
POLLARD, ANN E. See Ives, Pollard, Elvehjem and Strong ..... 347
Poults, brone, failure of feather pigmentation in, due to lysine deficiency ..... 387
—— calcification in, relative efficiency of vitamin $D_3$ and cod liver oil in promoting, influence of sources of phosphorus on ..... 599
—— turkey, nicotinic acid deficiency in, and occurrence of perosis ..... 79
Powder, skimmed milk, nutritive value of, failure of ether extraction to lower, in diets containing various vegetable fats. Studies on the comparative nutritive value of fats. VIII. ..... 747
Powdered whole milk, market milk, and evaporated milk, vitamin C content of ..... 161
Pre-exercise nutriment, some changes in, observations on efficiency of swimmers as related to ..... 525
Preschool children, calcium requirement of, further studies on ..... 127
—— —— nitrogen metabolism of 665
—— —— phosphorus metabolism of 657
Pressure, spinal fluid, vitamin A and ascorbic acid relationships in young bovine ..... 229
PRINGLE, EMMA M. See Barrott and Pringle ..... 35
Protein(s), biological value of, in relation to essential amino acids which they contain. III. Comparison of proteins with mixtures of the amino acids ..... 715
I. Endogenous nitrogen of man 533
II. Interconvertibility of biological values illustrated by supplementing egg and soy protein with essential amino acids ..... 555
—— certain dietary, comparative value of, for hemopoiesis in rat ..... 765
—— comparative growth-promoting value of, of wheat germ, corn germ, and of some other protein foods of plant and animal origin 675
—— comparison of, with mixtures of the amino acids. Biological value of proteins in relation to the essential amino acids which they contain. III. ..... 715
—— digestibility and metabolic fecal nitrogen, determination of ..... 13
—— evaluation of, in hypoproteinemic dogs ..... 237
—— fat and carbohydrate in diet, effect of amount of, on incidence and extent of carious lesions. Dental caries in the cotton rat. VI. 439
—— fish, nutritive value of, studies on. I. Evaluation by rat growth method and by Cannon method 175
II. The use of mackerel protein in the bioassay test for vitamin A 187
—— foods, some other, wheat germ, and corn germ of plant and animal origin, proteins of, comparative growth-promoting value of ..... 675
—— mackerel, use of, in bioassay test for vitamin A. Studies on nutritive value of fish proteins. II. 187
—— nutritive value of, in tobacco-seed oilmeal ..... 261
—— quality of, growth promoting, use of mice for measurement of 23
—— soy, and egg, biological values illustrated by supplementing, interconvertibility of, with essential amino acids. Biological value of proteins in relation to essential amino acids which they contain. II. ..... 555
—— supplements, animal, nutritional significance of, in diet of chick 485
Provitamin A activity relative, of carotene when introduced orally and parenterally in rat. Studies on carotenoid metabolism. VI. 299
Purified components, selection of. Self selection of diet. I. ..... 397
Pyridoxine and pantothenic acid deficiencies, study of, in monkey (Macaca mulatta) ..... 685
—— biotin and "folic acid." Nutritive value of canned foods. XVII. 347

RAPP, KARL E., J. T. SKINNER AND J. S. MCHARGUE. The nutritive value of the protein in tobacco-seed oilmeal ..... 261
—— tobacco-seed oil ..... 273
Rat(s), availability of wheat bran phosphorus for ..... 193
—— cotton, dental caries in. VI. The effect of the amount of protein, fat and carbohydrate in the diet on the incidence and extent of carious lesions ..... 439
—— growing albino. Relation of fat to economy of food utilization. I. 203
—— —— dietary niacin and tryptophane requirement of, factors affecting ..... 85
—— —— retention of dietary calcium by, effect of different grades of cocoa upon ..... 377
—— growth and food preference of, fed by lactose-dried milk ration containing butter fat or corn oil 321
—— hemopoiesis in, certain dietary proteins for, comparative value of 765

—— —— method and Cannon method, evaluation by. Studies on nutritive value of fish proteins. I. 175
—— mature albino. Relation of fat to economy of food utilization. II. 213
—— milk, volume and composition of, effect of changes in diet on 249
—— normal, whole blood and plasma of, ascorbic acid content of, with evidence of sex difference 573
—— nutritional status of, on milk diets containing succinylsulfathiazole 355
—— pantothenic acid deficiency and reproduction in 497
—— relative provitamin A activity of carotene when introduced orally and parenterally in. Studies on carotenoid metabolism. VI. 299
—— young, growth of, receiving atabrine, dietary calcium upon, effect of variations in the level of 647
Ration, lactose-dried milk, rats fed, growth and food preference of, containing butter fat or corn oil 321
—— of hog, relation of amount of thiamine in, to thiamine and riboflavin content of tissue 107
Relation of fat to economy of food utilization. I. By the growing albino rat 203
—— —— —— —— —— —— —— ——
—— II. By the mature albino rat 213
—— —— the amount of the thiamine in the ration of the hog to the thiamine and riboflavin content of the tissue 107
—— —— vitamin A intake to length of life, growth, tooth structure and eye condition 67
Relative efficiency of different forms of intravenously administered nitrogen balance and amino acid excretion 581
—— provitamin A activity of carotene when introduced orally and parenterally in the rat. Studies on carotenoid metabolism. VI. 299
Reproduction and pantothenic acid deficiency in rat 497
Requirement, calcium, further studies on, of preschool children 127
—— dietary niacin and tryptophane, factors affecting, of growing rat 85
Requirements, calcium, and calcium metabolism, variability in, of adult human subjects 407
Restaurant foods, thiamine, riboflavin, nicotinic acid, pantothenic acid and ascorbic acid content of 755
Retention of dietary calcium by growing rat, effect of different grades of cocoa upon 377
Riboflavin and thiamine content of tissue, relation of amount of thiamine in ration of hog to 107
—— thiamine, nicotinic acid and pantothenic acid content of colostrum and milk of cow and ewe 51
—— —— —— —— pantothenic acid and ascorbic acid content of restaurant foods 755
RIGGS, THOMAS R. See Sarett, Bennett, Riggs and Cheldelin 755
ROBERTSON, ELIZABETH C., AND ALONZO L. MORGAN. The effects of added vitamin A on the conjunctiva and the level of vitamin A in the blood 471
ROLLMAN, HILDA S. See Deuel, Hrubetz, Johnston, Rollman and Geiger
RYER, HELEN. See Murlin, Edwards, Hawley and Clark 533
—— —— —— —— —— —— —— ——
—— 555

SARETT, HERBERT P., MARGARET J. BENNETT, THOMAS R. RIGGS AND VERNON H. CHELDELIN. Thiamine, riboflavin, nicotinic acid, and ascorbic acid content of restaurant foods 755
SARMA, P. S. See Krehl, Sarma, Teply and Elvehjem 85
SCHNAKENBERG, GEORGE. See Deuel, Hrubetz, Johnston, Winzler, Geiger and Schnakenberg 175
SCHWEIGERT, BERNARD S., JAMES H. SHAW, THERESSA M. ZEPPLIN AND CONRAD A. ELVEHJEM. Dental caries in the cotton rat. VI. The effect of the amount of protein, fat and carbohydrate in the diet on the incidence and extent of carious lesions 439
SCOTT, E. M. Self selection of diet. I. Selection of purified components 397
—— H. M. See Matterson, Scott and Singsen 599
SEELEY, ROBERT D. See Allison, Seeley, Brown and Anderson 237
Self selection of diet. I. Selection of purified components 397
Sex difference, evidence of, whole blood and plasma of normal rats with, ascorbic acid content of 573
SEXTON, EDWIN L., JOHN W. MEHL AND HARRY J. DEUEL, JR. Studies on carotenoid metabolism. VI. The relative provitamin A activity of carotene when introduced orally and parenterally in the rat 299
SHARP, PAUL F. See Stewart and Sharp 161
SHAW, JAMES H. See Schweigert, Shaw, Zepplin and Elvehjem 439
SHERMAN, H. C. See Houk, Thomas and Sherman 609
SHIMER, E. ROBERTA. See Parrish, Shimer and Hughes 321
Significance of fatty infiltration in the development of hepatic cirrhosis due to choline deficiency 141
SINGSEN, E. P. See Matterson, Scott and Singsen 599
Skeleton in growing pigs, fat content of, influence of phosphorus, calcium and vitamin $D_3$ upon 565
Skimmed milk powder, nutritive value of, failure of ether extraction to lower, in diets containing various vegetable fats. Studies on the comparative nutritive value of fats. VIII. 747
SKINNER, J. T. See Rapp, Skinner and McHargue 261
—— —— —— —— —— —— —— ——
—— 273
SMITH, DORIS. See Murlin, Edwards, Fried and Szymanski 715
—— —— —— —— —— Hawley and Clark 533
SMYTH, IRENE M. See Deuel, Hendrick, Movitt, Crockett, Smyth and Winzler 747
Soil fertility, vegetable crops in relation to. IV. Nutritional values of New Zealand spinach 59
Some inter-relationships of dietary iron, copper and cobalt in metabolism 609

Soy protein and egg, biological values illustrated by supplementing, interconvertibility of, with essential amino acids. Biological value of proteins in relation to essential amino acids which they contain. II. 555
Soybean oil meal, autoclaving, influence of, on availability of cystine and methionine for chick 449
Span, life, of rats, apparent prolongation of, by intermittent fasting 363
Spinach, New Zealand, nutritional values of. Vegetable crops in relation to soil fertility 59
Spinal fluid pressure, vitamin A and ascorbic acid relationships in young bovine 299
STARE, F. J. See Williamson, Hegsted, McKibbin and Stare 647
Status, nutritional, of rats on milk diets containing succinylsulfathiazole 355
STEGGERDA, FREDERIC R., AND HAROLD H. MITCHELL. The effect of the citrate ion on the calcium metabolism of adult human subjects 423
——— Variability in the calcium metabolism and calcium requirements of adult human subjects 407
STEWART, AUBREY P., JR., AND PAUL F. SHARP. Vitamin C content of market milk, evaporated milk and powdered whole milk 161
Storage, liver, of vitamin A, utilization of carotene and vitamin A for, influence of choline and of trypan blue upon 333
STRONG, FRANK M. See Ives, Pollard, Elvehjem and Strong 347
Studies, further, on calcium requirement of preschool children 127
—— on carotenoid metabolism. VI. The relative provitamin A activity of carotene when introduced orally and parenterally in the rat 299
—— —— the comparative nutritive value of fats. VII. Growth rate with restricted calories and on injection of the growth hormone 737
—— VIII. The failure of ether extraction to lower the nutritive value of skimmed milk powder in diets containing various vegetable fats 747
—— —— —— nutritive value of fish proteins. I. Evaluation by the rat growth method and by the Cannon method 175
—— —— II. The use of mackerel protein in the bioassay test for vitamin A 187
Study of pyridoxine and pantothenic acid deficiencies in the monkey (Macaca mulatta) 685
Subjects, adult human, calcium metabolism and calcium requirements, variability in 407
—— —— —— —— —— of, effect of citrate ion on 423
Succinylsulfathiazole, milk diets containing, nutritional status of rats on 355
Supplements, animal protein, nutritional significance of, in diet of chick 485
SWIFT, RAYMOND W. See Forbes, Swift, Elliott and James 203
—— —— 213
Swimmers, efficiency of, observations on, as related to some changes in pre-exercise nutriment 525
SZYMANSKI, THADDEUS A. See Murlin, Edwards, Fried and Szymanski 715

TEMPERATURE, energy and gaseous metabolism of chicken from hatch to maturity as affected by 35
TEPLY, LESTER J. See Krehl, Sarma, Teply and Elvehjem 85
Thiamine, added, mental response to 283
—— amount of, relation of, in ration of hog to thiamine and riboflavin content of tissue 107
—— and riboflavin content of tissue, relation of amount of thiamine in ration of hog to 107
—— riboflavin, nicotinic acid and pantothenic acid content of colostrum and milk of the cow and ewe 51
—— —— —— —— pantothenic acid and ascorbic acid content of restaurant foods 755
—— urinary excretion of, four methods for studying, comparison of 635
THOMAS, A. W. See Houk, Thomas and Sherman 609
Tissue, thiamine and riboflavin content of, relation of amount of thiamine in ration of hog to 107
Tobacco-seed oil, nutritive value of 273
—— oilmeal, protein in, nutritive value of 261
TODHUNTER, ELIZABETH N., AND THELMA J. MCMILLAN. The ascorbic acid content of whole blood and plasma of normal rats with evidence of a sex difference 573
Tooth structure, length of life, growth and eye condition, relation of vitamin A intake to 67
Trypan blue and choline, influence of, upon utilization of carotene and vitamin A for liver storage of vitamin A 333
Tryptophane and niacin requirement, dietary, factors affecting, of growing rat 85

UNSATURATED fat acids, essential, and alpha-tocopherol, interrelation of. Covitamin studies. V. 699
Urinary excretion of thiamine, four methods for studying, comparison of 635
Use of mackerel protein in the bioassay test for vitamin A. Studies on the nutritive value of fish proteins. II. 187
—— —— mice for the measurement of the growth promoting quality of proteins 23
Utilization, food, economy of, relation of fat to. I. By the growing albino rat 203
—— II. By the mature albino rat 213

VARIABILITY in the calcium metabolism and calcium requirements of adult human subjects 407
Vegetable crops in relation to soil fertility. IV. Nutritional values of New Zealand spinach 59

—— fats various, diets containing, skimmed milk powder in, nutritive value of, failure of ether extraction to lower. Studies on the comparative nutritive value of fats. VIII. 747
Vitamin A, added, effects of, on the conjunctiva and the level of vitamin A in the blood 471
—— —— and carotene, utilization of, influence of choline and of trypan blue upon, for liver storage of vitamin A 333
—— —— ascorbic acid and spinal fluid pressure relationships in the young bovine 229
—— —— bioassay test for, use of mackerel protein in. Studies on nutritive value of fish proteins. II. 187
—— —— in the blood, level of, and the effects of added vitamin A on the conjunctiva 471
—— —— intake, relation of, to length of life, growth, tooth structure and eye condition 67
—— —— liver storage of, utilization of carotene and vitamin A for, influence of choline and of trypan blue upon 333
—— C content of market milk, evaporated milk, and powdered whole milk 161
—— $D_2$ and cod liver oil, relative efficiency of, influence of sources of phosphorus on, in promoting calcification in poults 599
—— —— phosphorus and calcium, influence of, upon fat content of skeleton in growing pigs 565
Volume and composition of rat milk, effect of changes in diet on 249

WADDELL, J. See Patton, Marvel, Petering and Waddell 485
WAISMAN, H. A. See McCall, Waisman, Elvehjem and Jones 685
WAKIM, KHALIL G. See Day, Wakim, Zimmerman and McClung 355
Wheat bran phosphorus, availability of, for rat 193
—— germ, corn germ, and some other protein foods of plant and animal origin, proteins of, comparative growth-promoting value of 675
Whole milk, powdered, market milk, and evaporated milk, vitamin C content of 161
WIDNESS, KATHERINE D. See Jones and Widness 675
WILLIAMSON, ANNE, D. M. HEGSTED, J. M. MCKIBBIN AND F. J. STARE. The effect of variations in the level of dietary calcium upon the growth of young rats receiving atabrine 647
WINZLER, RICHARD J. See Deuel, Hendrick, Movitt, Crockett, Smyth and Winzler 747
—— —— —— —— —— Hrubetz, Johnston, Winzler, Geiger and Schnakenberg 175
WITTWER, S. H., AND H. R. GOFF. Vegetable crops in relation to soil fertility. IV. Nutritional values of New Zealand spinach 59
WYNN, WINFREY. See Haldi and Wynn 525

YDSE, LAURA C. See Bosshardt, Ydse, Ayres and Barnes 23

ZEPPLIN, THERESSA M. See Schweigert, Shaw, Zepplin and Elvehjem 439
Zimmerman, William H. See Day, Wakim, Zimmerman and McClung 355